STATISTICS FOR MANAGEMENT (Session 1)

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IDS 570
FALL 2016

Plan

1. Why statistics?

2. Why R?

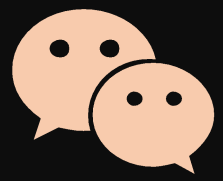
3. Syllabus and class logistics

Why Statistics?

What's statistics?

"…. collections of information of all types, [including] analysis and interpretation of such data… [using] statistical inference" (Wikipedia)

Examples of business applications using statistics



	Global	N. America	EMEA	APAC	L. America
Customer Relationship Management	1	4	1(t)	2(t)	4
Benchmarking	2(t)	2(t)	1(t)	14	2
Employee Engagement Surveys	2(t)	1	5	8	9(t)
Strategic Planning	2(t)	2(t)	9	5(t)	1
Outsourcing	5	6	3(t)	5(t)	9(t)
Balanced Scorecard	6(t)	7(t)	3(t)	15(t)	3
Mission and Vision Statements	6(t)	5	8	18	5
Supply Chain Management	8	7(t)	10	2(t)	13(t)
Change Management Programs	9	9	6(t)	21	9(t)
Customer Segmentation	10	14(t)	6(t)	12(t)	7
Core Competencies	11(t)	10	–	7	–
Big Data Analytics	11(t)	–	–	1	–
Total Quality Management	11(t)	–	–	4	–
Satisfaction and Loyalty Management	16	–	–	9	–
Digital Transformation	19(t)	–	–	10	–
Business Process Reengineering	15	–	–	–	6
Strategic Alliances	17	–	–	–	8

Note: (t)=tied

Source: Bain & Co. 2015 (+13,000 respondents in +70 countries)

In customer relationship management

Why R?

R

The 👎

`> command line`

`You need to code`

Although you'll need to write code in Excel (VBA) and any other statistical software

Initially high learning curve

r4stats.com/articles/why-r-is-hard-to-learn/

R

The 👍

Increasingly user friendly (RStudio!)

F R E E

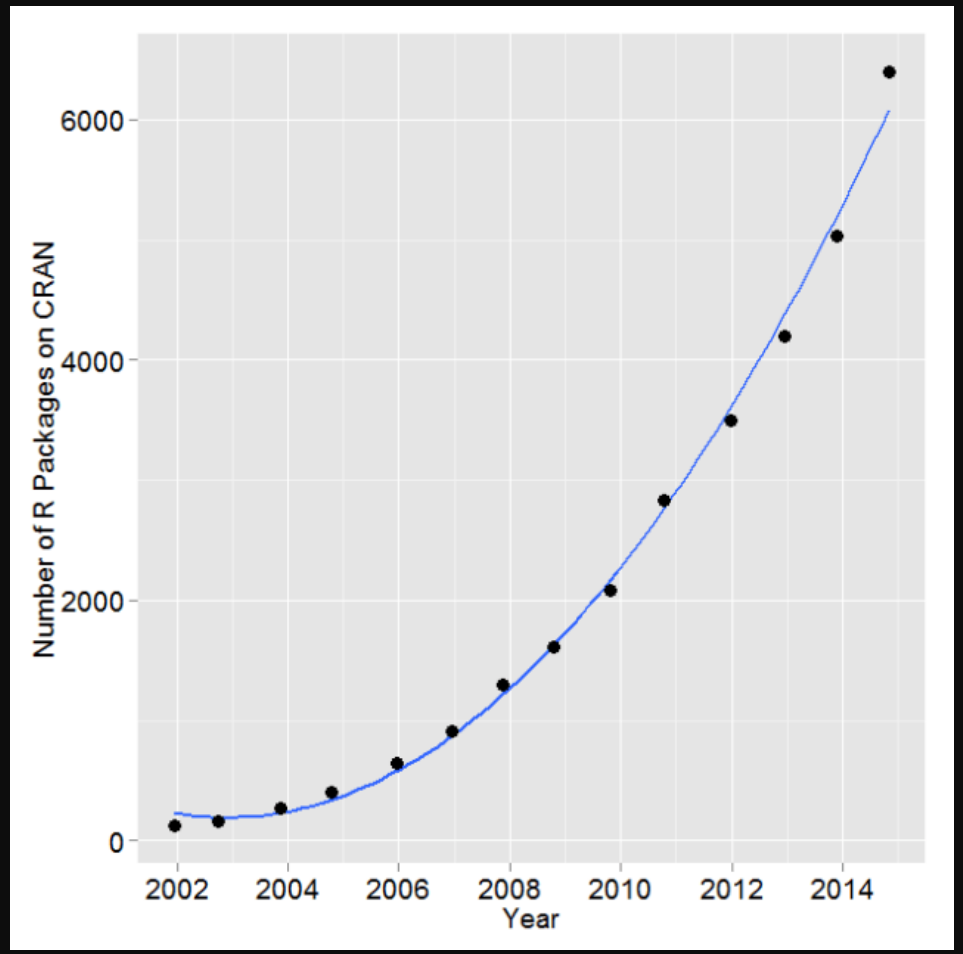
Excellent documents and many, many recipes
(R=550 blogs; Python=60; SAS=40)

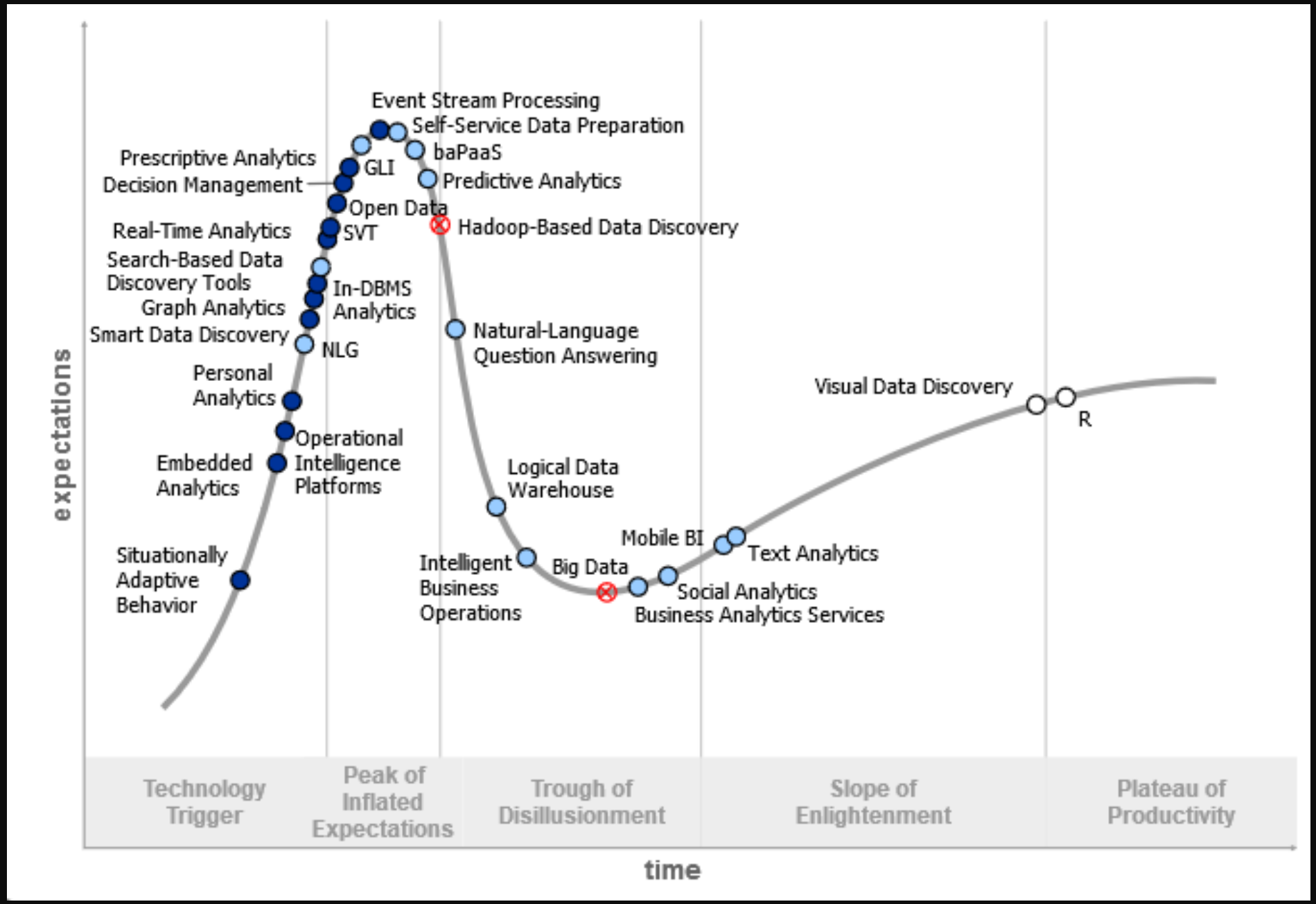
Incredible set of packages makes it extremely capable
(8,000+, and they are free, too)

R

"During 2015 alone, R added more functions/procs than SAS Institute has written in its entire history"

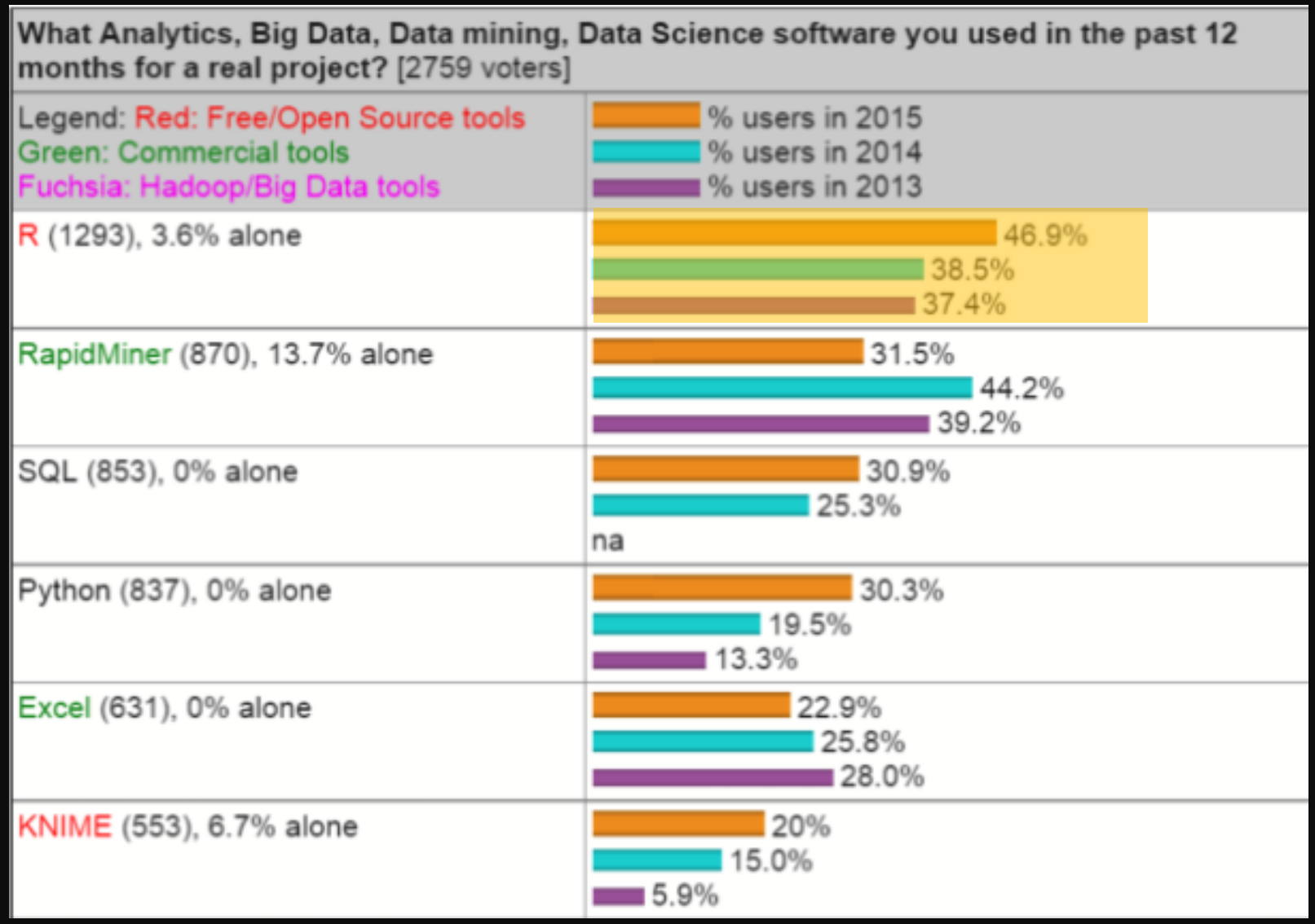
Source: r4stats





Source: Hype Cycle for Business Intelligence and Analytics, Gartner 2016

R



Source: KDnuggest 2015 (2,759 respondents)

R

SKILL	2015	YR/YR CHANGE
HANA (High Performance Analytical Appliance)	$ 154,749	n/a
Cassandra	$ 147,811	14.9%
Cloudera	$ 142,835	12.6%
PaaS (Platform as a Service)	$ 140,894	8.3%
OpenStack	$ 138,579	19.4%
CloudStack	$ 138,095	20.0%
Chef	$ 136,850	10.8%
Pig	$ 132,850	6.7%
MapReduce	$ 131,563	3.3%
Puppet	$ 131,121	9.2%
TcL (Tool Command Language)	$ 130,906	17.5%
Sqoop	$ 130,865	14.5%
NoSQL	$ 130,290	9.9%
Hive	$ 129,400	7.1%
Hadoop	$ 128,888	6.2%
UML (Unified Modeling Language)	$ 128,198	12.1%
SDN (Software Defined Network)	$ 127,464	12.0%
Omnigraffle	$ 127,392	11.1%
Fortran	$ 127,359	24.1%
SOA (Service Oriented Architecture)	$ 127,268	7.4%
R	$ 126,249	9.7%
Docker	$ 126,131	n/a
Netezza	$ 126,035	13.0%

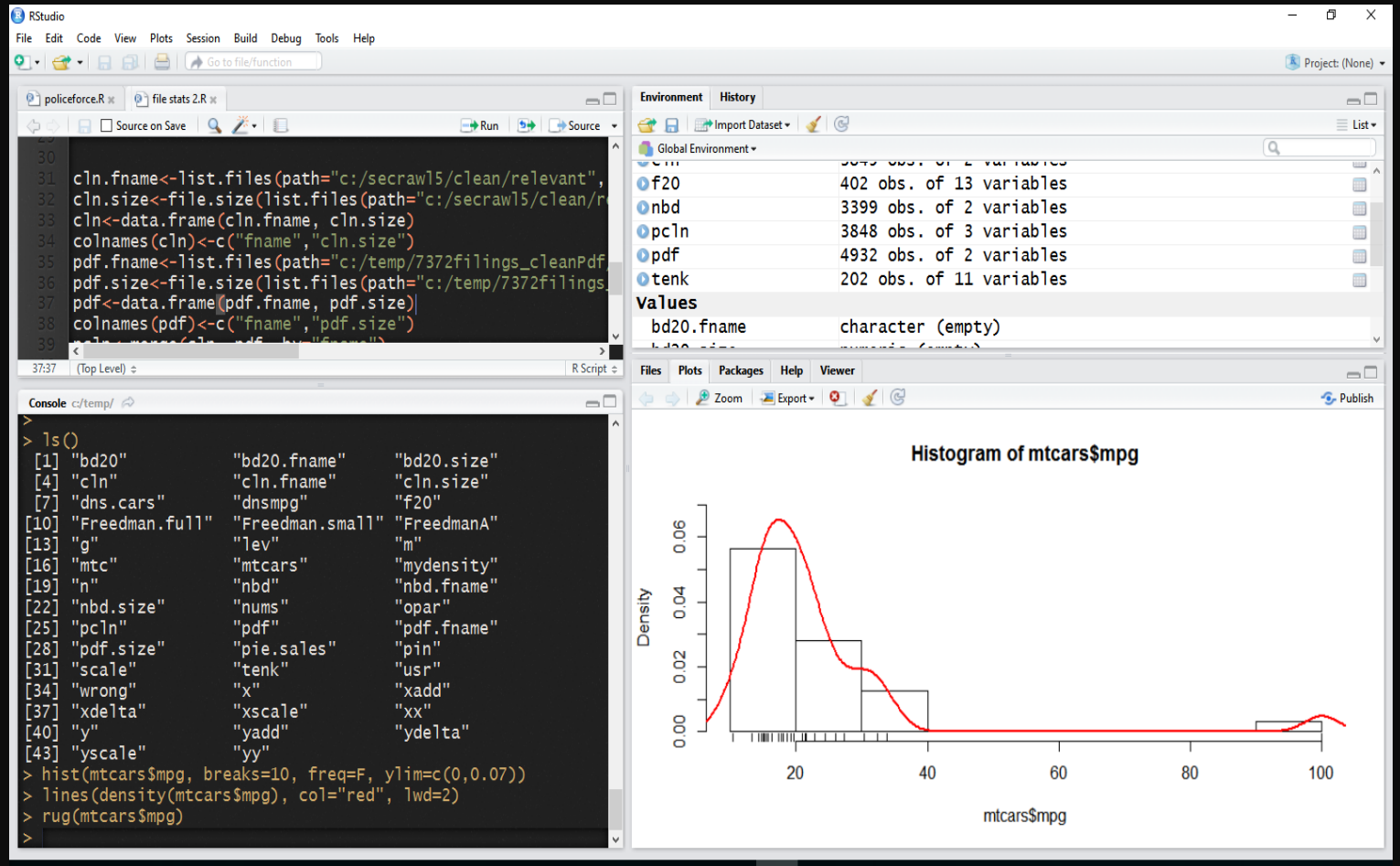
Source: Dice 2016
(+16,000 tech professionals)

Hello R (RStudio)!

R Basics (orientation)

Code /data

R console



R environment

Graphics

R Basics (orientation)

Know the shortcuts

Tab = autocomplete

CTRL (Command for Mac) +Up arrow = browse through a list of commands you've entered.

CTRL (Command for Mac) + Enter = copy current line, or multiple lines, from editor to console

R Basics (orientation)

- ✔ Create a folder called IDS570 under
- ✔ In RStudio, change your working directory to IDS570
- ✔ Install the "ggplot2" package

Solution

```
# you can create a folder by using your
computer's operating system, or through R:

getwd()
# [1] “c:/users/zack kertcher/documents"
dir.create("c:/users/zack
Kertcher/documents/IDS570")
setwd("IDS570")

install.packages('ggplot2')
```

R Basics (operations and assignment)

- ✔ Assign the numbers 4, 3.7, 4, 3.5 to object score
- ✔ Assign the number 4 to object tests
- ✔ Assign the result of score divided by tests to object avg.score
- ✔ Print the content of avg.score
- ✔ Assign the number 4 to object score
- ✔ Did avg.score change? Why?

Solution

```
score <- c(4,3.7,4,3.5)
tests <- 4
avg.score <- score/tests
avg.score
score <- 4
avg.score
# It's content did not change because the object
avg.score itself was unchanged. If we were to re-
run the assignment, it would have changed.
```

R Basics (data types)

- ✔ What is the data class of avg.score?
- ✔ Add the value "employee" to avg.score like this: avg.score <- c("employee", avg.score)
- ✔ Print the content of avg.score
- ✔ What is the class of avg.score now? Why is it different?

Solution

```
class(avg.score)
# [1] "numeric"
avg.score <- c("employee", avg.score)
avg.score class(avg.score)
# [1] "character"

# The data type has changed because we added a
character value to avg.score
```

R Basics (functions)

- ✔ Generate a sequence of numbers from 7 to 100, by 4.05, and assign it to my.seq
- ✔ View the last 4 numbers like this: tail(my.seq,n=4)
- ✔ Round the last four numbers of my.seq to a single decimal, and assign them to new.seq

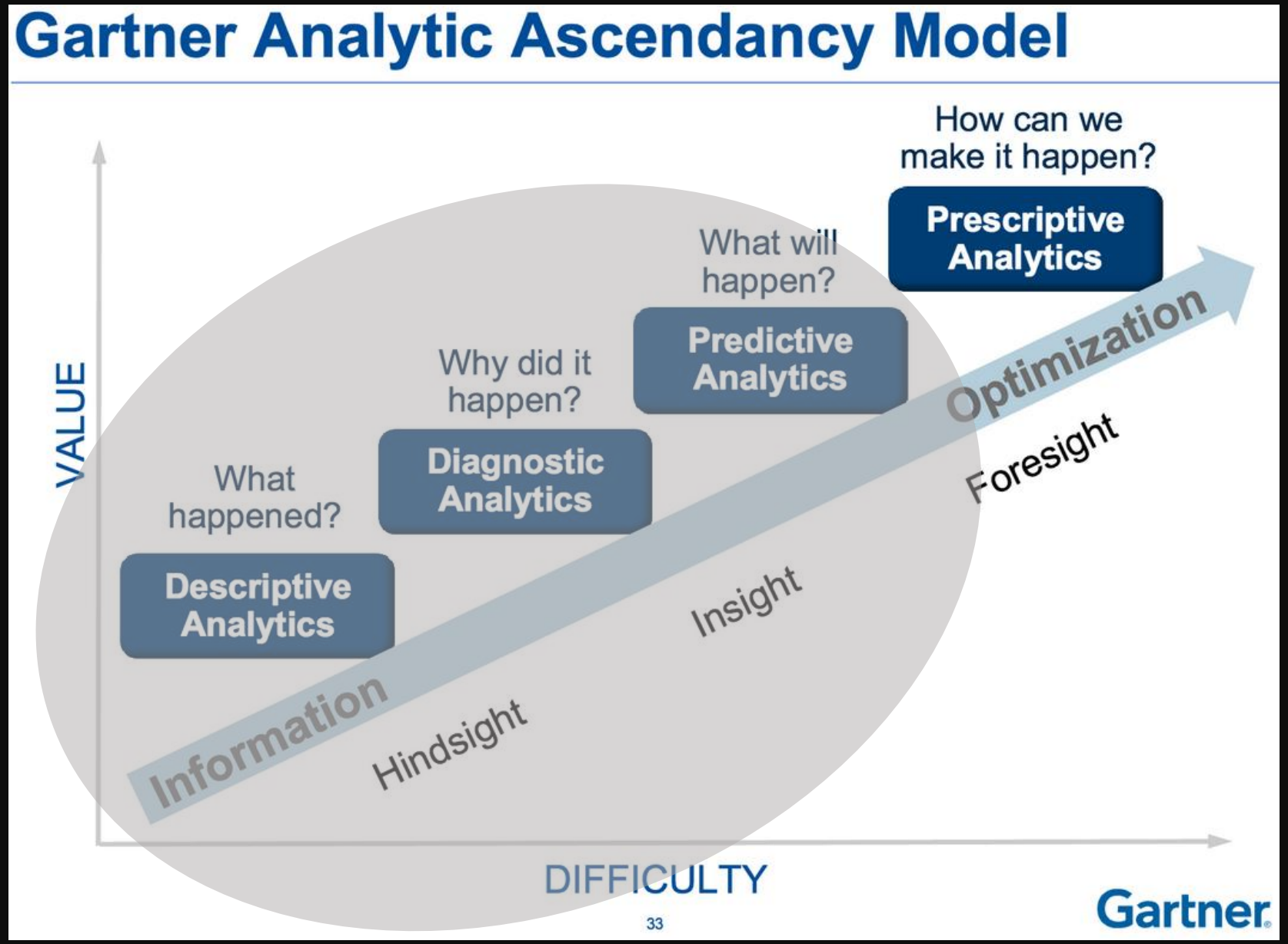
Solution

```
my.seq <- seq(from=7, to=100, by=4.05)

new.seq <- round(tail(my.seq,n=4),1)
```

Course syllabus and logistics

- ✔ Reading? None. Recommended reading posted on Blackboard.
- ✔ Questions? Office hours: after every class or by appointment.
- ✔ Coursework
  - Homework: Most weeks, short. Submit by the following class, and two in-class quizzes (25%)
  - Team project: presentation + report (25%)
  - Exams: midterm and final (50%)
- ✔ Feedback? www.admonymous.com/ids_570



Source: Gartner 2015

Class	Date	Topic
1	8/27	Introduction to Statistics and R
-	9/3	No Class (Labor Day)
2	9/10	Data
3	9/17	Descriptive statistics
4	9/24	Probability and univariate distributions
5	10/1	Bivariate associations
6	10/8	Tables and plots
7	**10/15**	**Midterm Exam**
8	10/22	Statistical research design
9	10/29	Hypothesis testing
10	11/5	Analysis of variance
11	11/5	Linear regression
12	11/12	Advanced topics
13	**11/19**	**Project presentations**
-	11/26	No class (Thanksgiving)
14	12/03	Exam Review
15	**12/10**	**Final exam**

Demo and Sneak Preview to Data

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